

# AOARD REPORT

The Korean Institute of Science and Technology (KIST), Seoul  
Korea, 1 July 1994

31 August 1994  
P. McQuay  
AOARD



The Korean Institute of Science and Technology (KIST) is South Korea's premier government sponsored R&D laboratory, and is seen as playing a pivotal role in the governments drive to build a new Korea. KIST has always been active in the development and transition of technology to industry, and recently has been reorganized and charged with fostering basic science in support of future technology. Several groups at KIST are doing high quality research of interest to the Air Force, particularly in the Division of Electronics and Information Technology, and the Divisions of Metals and Ceramics, which warrants a more in-depth and visit and discussions.

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AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

ASIAN OFFICE OF AEROSPACE RESEARCH AND DEVELOPMENT

TOKYO, JAPAN

UNIT 45002

APO AP 96337-0007

DSN: (315)229-3212

Comm: 81-3-5410-4409

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## 2. OVERVIEW AND BACKGROUND

The Korean Institute of Science and Technology (KIST) is South Korea's premier government sponsored R&D laboratory, the first multi-disciplinary research institute in Korea. It was founded in 1966 with a grant from the US government. In 1981, KIST merged with the Korea Advanced Institute of Science (KAIS), to form a new organization, KAIST. In 1989, KIST was reborn again as KIST, separating from KAIST. The headquarters and the majority of the laboratories of KIST are in Seoul. Up until several years ago the majority of the faculty, students and laboratories of KAIST remained in Seoul, but the majority has now moved to Korea's "Science Town," Taejon.

Not counting its affiliated research institutes, KIST employs approximately 800 people, of which approximately 80% are involved in research. Of that total, about 27% of KIST employees have a PhD. KIST reports to the Ministry of Science and Technology (MOST), and receives all of its support or operating budget from MOST. It reportedly performed over 4900 research projects, valued at \$250M. About 70% of its research budget comes from MOST or the Ministry of Trade and Industry (MOTI), and approximately 30% from industrial partners.

As of January 1993, KIST was comprised of three research divisions, the Division of Advanced Materials, the Division of Environment and Welfare Technology, and the Department of Applied Science and Engineering. Later in 1993, KIST was reorganized into six research and technology divisions: Applied Science; Chemical Engineering and Polymers; Material Science and Engineering; Mechanical/Control Systems; Electronics and Information Technology; Environment and CFC Technology. KIST occasionally spins off successful laboratories or institutes. Two examples of this are the Systems Engineering Research Institute (SERI), and the Genetic Engineering Research Institute (GERI), which are both located in Taejon.

One of the goals of the 1993 reorganization was to place a larger emphasis on the development and nurturing of basic science in Korea. The charter of KIST traditionally has focused on promoting developing and transferring technology to Korean industry, but has recently been expanded with a new emphasis on basic research. The importance of basic research to Korea's future industrial growth seems to be a pervasive theme in Korea today.

KIST performs a variety of different types of research programs and contracts, with a variety of clients or customers. Illustrative of this is the budget for the Division of Advanced Materials in 1992. Of the total research budget of \$11.4 M, basic research comprised 3%, international cooperative research comprised 8%, 17% was devoted to joint research with industry, 16% came from industry for contract research, and the majority, 56%, was provided for national projects.

KIST currently has an active international cooperative R&D program, with emphasis on projects with Japan and the Former Soviet Union. An indicator of Korea's current international activities or interests can be seen in the placement of its two international liaison offices, one in Tokyo, Japan, and one in Moscow, Russia.

## 3. DISCUSSIONS WITH MANAGEMENT AND FACULTY OF KIST

The visit to KIST was attended by Dr. Shiro Fujishiro, Dr. Tom Davis, Dr. Joe Yakura, and Capt Paul McQuay, of AOARD, Tokyo. As it was the first trip by AOARD to Korea, much of the visit consisted of mutual introductions. Very little time was available for detailed technical discussions or tours of facilities.

Our visit to KIST was hosted by:

Dr. Young Sun Uh

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Director, Division of Research Planning and Coordination  
 Korea Institute of Science and Technology  
 P.O. Box 131  
 Cheongryang, Seoul 136-791  
 Korea  
 Tel/Fax: +82 (2) 968-0091/963-4013

and Mr. Min Shik Cho, Manager, Department of International Cooperation (Tel/Fax: +82 (2) 959-3762/959-0448).

Following a brief welcome and introduction briefing by our hosts, we met with Dr. Kwang Bae Kim Director, Division of Electronics and Information Technology (Tel/Fax: +82 (2) 962-4611/969-3754). Also present were Dr. Samg Sam Choi and Dr. Jae Cheon Lee, laboratory leaders in the division. Highlights of the brief discussions included a mutual interest in robotics, research by Dr. Lee's group in the area of signal and image processing, computer aided design, and multi-media databases, and research by Dr. Choi's group in optics, lasers, superconductors, and 3-D display systems.

We next met with Dr. Jong Sei Park, Director of the Division of Applied Sciences. The meeting was unfruitful, with very few areas of mutual interest identified.

Our last meeting was with Dr. Yoon Ho Kim, Director, Division of Ceramics (Tel/Fax: +82 (2) 959-3762/959-0448), and four or five researchers in his group, including Dr. Sung Do Jang, Research Fellow, and past Director of the Materials and Science Engineering Division. Dr. Jang and his group are well known for their work in Sol-Gel processing of fine ceramics, and has had a cooperative research program on fine ceramics with the University of Dayton. In spite of a large level of investment in ceramic technology for automotive use in Japan and the US, they reported to us that the Korean auto industry is very conservative, and not very interested in ceramics or intermetallics such as TiAl alloys.

#### 4. SUMMARY AND COMMENTS

Traditionally KIST has maintained a strong technology focus, in line and in support of Korean industry, but is currently undergoing a shift in interests. This change of interests toward more basic science is similar to the transformation which began in Japan a decade or more ago, and which continues today. Although government funded national initiatives make up the bulk of research performed at KIST, KIST is also engaged in partnership or joint research with industry, as well as performing some research for industry on a contractual basis. KIST also appears to have an active international cooperation program. Although the largest foreign players in Korea today are Japan and the Former Soviet Union, clearly there are some areas of mutual interest with the US R&D community, which warrant further investigation.

Several researchers commented on the strengthening ties between the Japanese and Korean R&D communities. They commented that over the last few years there has been an increase in bilateral workshops and research programs, and that the relationship has matured into more of a peer-like relationship, where both sides have something to offer the other. Although fairly strong personal and professional ties exist between the US and Korean R&D communities, very few cooperative programs exist.

Overall, we found KIST to be well staffed and equipped, and well connected with US and European science and technology, at least on a personal or professional level. Several groups at KIST are doing high quality research of interest to the Air Force, particularly in the Division of Electronics and Information Technology, and the Division of Ceramics, which warrants a more in-depth and focused visit and discussions.